



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	LACONIA, NH	<b>Accident Number:</b>	IAD99FA025
<b>Date &amp; Time:</b>	01/04/1999, 1217 EST	<b>Registration:</b>	N14001
<b>Aircraft:</b>	Lake LA-4-250	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	1 Fatal, 1 Serious
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

The pilot/owner, sitting in the left seat, and flight instructor were on an instructional instrument flight. Shortly after takeoff, the airplane was seen trailing smoke. The smoke and engine noise stopped, then started again as the airplane leveled off, and began a left, 180-degree turn. The smoke and engine noise again stopped. Then the airplane descended, impacted a parking lot in a left-wing-down attitude, and bounced through a snow bank and down a 15-foot embankment, onto a field. It then rolled upside down, and caught on fire. A large hole was in the top of the engine crankcase, in line with a dislodged number 4 connecting rod. A hole in the bottom of the case was in line with a dislodged number 5 connecting rod. The number 1 connecting rod bearing and journal had light distress scoring in line with the oil supply hole. The number 2 connecting rod bearing and journal were normal, except for fire and heat damage to the bearing. The number 3, 4, 5, and 6 connecting rod journals had heavy distress scoring with extruded bearings. The injuries sustained by the pilot/owner precluded any recollection of the flight. He was not known to preheat the engine, and there were no witnesses to the airplane's preflight, start, runup or takeoff. Outside air temperature was 23 degrees Fahrenheit, and the airplane was stored in an unheated hangar. Recommended time between engine overhaul was 2,000 hours, or 12 years, whichever came first. The engine had in excess of 919 hours of operation, was built over 15 years earlier, and had not had an overhaul.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power during initial climb due to oil starvation. Contributing to the accident was the failure to perform an engine overhaul.

## Findings

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Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF

Phase of Operation: TAKEOFF - INITIAL CLIMB

### Findings

1. (C) FLUID,OIL - INADEQUATE

2. POWERPLANT - FAILURE

3. (C) MAINTENANCE,OVERHAUL - NOT PERFORMED - OTHER MAINTENANCE PERSONNEL

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Occurrence #2: FORCED LANDING

Phase of Operation: DESCENT - EMERGENCY

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Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER

Phase of Operation: EMERGENCY LANDING

## Factual Information

### HISTORY OF FLIGHT

On January 4, 1999, at 1217 Eastern Standard Time, a Lake LA-4-250, N14001, was destroyed when it impacted terrain during a forced landing, shortly after takeoff from Laconia Municipal Airport (LCI), Laconia, New Hampshire. The certificated private pilot/owner received serious injuries and the certificated flight instructor was fatally injured. Visual meteorological conditions prevailed, and an instrument flight rules flight plan had been filed between Laconia and Manchester Airport (MHT), Manchester, New Hampshire. The instructional instrument flight was conducted under 14 CFR Part 91.

A witness near the airport stated that the airplane was trailing smoke shortly after takeoff from Runway 26. Another witness, about 3 miles further along the departure path, stated that he saw gray smoke trailing the engine as the airplane was climbing. He recalled that the smoke and engine noise stopped, then started again, as the airplane leveled off and began a left, 180-degree turn. The witness thought the airplane was returning to the airport, and watched as it started another left turn towards the north/northwest, but no longer smoking or emitting engine noise. The witness was momentarily distracted, but then regained sight of the airplane as it descended below a treeline, on a southerly heading.

Other witnesses saw the airplane impact an asphalt parking lot, in a left-wing-down attitude, then bounce through a snow bank and down a 15-foot embankment, onto a field. The airplane rolled, and came to rest upside down on a west/southwesterly heading. Witnesses stated that the wreckage was burning when they arrived, and that they were able to extract the pilot/owner from the left seat before the airplane became completely engulfed in flames.

The accident occurred during the daylight hours, with the first impact point at 43 degrees, 32.55 minutes north latitude, 71 degrees, 29.27 degrees west longitude.

### PILOT INFORMATION

The certificated private pilot/owner held ratings for single engine and multi-engine land and sea airplanes. On his most recent Federal Aviation Administration (FAA) third class medical certificate application, dated October 2, 1998, the pilot stated he had 700 hours of flight time. In a replacement logbook, dated January 2, 1999, the pilot listed 502 hours of flight time.

The flight instructor was a certificated commercial pilot, with ratings for single engine land airplanes and instrument-airplane, and was a single engine airplane certificated flight instructor, and an instrument airplane flight instructor. On his most recent FAA second class medical certificate application, dated July 7, 1998, the pilot stated he had 5,700 hours of flight time.

### WRECKAGE AND IMPACT INFORMATION

All major components of the airplane were found at the accident scene. The initial impact point in the parking lot was marked by metal scrapings, and paint chips which matched the color of the airplane. The main wreckage was located in a field, about 130 feet, 180 degrees magnetic, from the initial impact point. The left door, the outboard portion of the left wing, and the left pontoon were lying in the field, away from the main wreckage. The majority of the remaining wreckage was consumed in the post-crash fire.

The flap actuator and selector were found in the down position. The nose wheel was in the up position, both main landing gear drag struts were not extended, and the gear selector valve was in the up position. Flight control continuity could not be verified because 80 percent of the push rods were consumed in the post-crash fire. All but one flight control bell crank and associated attach fittings were found in the wreckage.

The engine, with the propeller still attached, was lying inverted in the middle of the main debris field. There was a 5-inch hole on the top of the casing, directly above the number 3 and number 4 connecting rods. After removal of the oil sump and melted ash, an additional hole was found on the bottom of the casing. The bottom hole was aligned with the number 4 and number 5 connecting rods. The majority of the number 4 connecting rod was absent, and the number 5 connecting rod was protruding through the casing. Both rods displayed elongation and discoloration similar to heat distress.

## TESTS AND RESEARCH

The engine, a Textron Lycoming IO-540-C4B5, was further examined at the manufacturing facility under the supervision of a Safety Board investigator. The manufacturer produced a disassembly report, and the factual observations of that report were verified by the investigator. Excerpts included:

"A large hole was observed in the top of the crankcase in line with the dislodged number 4 connecting rod. A hole in the bottom of the case was in line with the dislodged number 5 connecting rod.... The engine could not be rotated. Compression could not be checked. Engine continuity was verified during engine disassembly and was normal except for broken connecting rods.... The fire damaged oil suction screen was found clean. The partial pressure filter appeared to be contaminated with bearing material, but was fire damaged.... All of the push rods had fire damage with the number 3 intake found bent along with the fire damage.... The oil sump and induction housing were destroyed in the fire.... The oil filter was fire damaged, with ferrous and non-ferrous metal contamination found in the partial filter element returned with the engine.... The crankcase cylinder pads, parting surfaces, and bearing saddles were all found in normal condition. The oil holes were open.... All of the main bearings and journals were normal, with the exception of fire damage. The number 1 connecting rod bearing and journal had light distress scores in line with the oil supply hole. The number 2 connecting rod bearing and journal was normal, except for fire and heat damage to the bearing. The number 3, 4, 5, and 6 connecting rod journals had heavy distress scoring with extruded bearings."

## MEDICAL AND PATHOLOGICAL INFORMATION

According to the pilot-owner's wife, the injuries he sustained precluded any recollection of the flight.

An autopsy was conducted on the flight instructor's remains by the State of New Hampshire, Department of Health and Human Services, Concord, New Hampshire. Toxicological testing was performed by the FAA Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma.

## ADDITIONAL INFORMATION

No witnesses were found, who might have seen the airplane start up, taxi, run up, or take off. According to the FAA inspector on scene, the pilot's hangar was checked. It was an unheated

hangar, there was no electricity installed, and there was no engine preheat equipment. Additionally, in discussions with people who knew the pilot, none had ever known him to preheat the engine.

A reference book about aircraft piston engines, the "Sky Ranch Engineering Manual," included the following:

Under "Engine Starting and Idle,"

"Preheat is required when the outside temperatures are +10 degrees Fahrenheit and below. Consult your POH for specific preheat recommendations for your engine.... Preheat recommendations assume you are using the correct grade of oil for the season.... This does not mean the engine will not start at cold temperatures, but starting without preheat has caused engine damage. Even though your starter is sufficiently strong to turn the engine, the oil pump may not be able to pump the oil.... Scuffed piston skirts, spalled cam followers and seized thrust bearings are indicative of cold weather starts....

Under "Oil Starvation,"

"The first area of damage is usually the rod bearing. Upon loss of oil pressure, the rod journal comes in contact with the rod bearing. Heating and scuffing causes the bearing babbitt to melt and flow off the bearing shell. The bearing shell then scores the crankshaft rod journal. With the loss of bearing babbitt, the rod will be loose on the journal. If the engine continues to operate, the rod bolts fail, releasing the rod from the crankshaft. Considerable engine damage occurs. In the shop, we call this 'dynamic disassembly'.... After oil starvation...examine the rod bearings for damage. On Lycoming engines, the most likely damaged rod bearing would be the number 3 cylinder."

The Textron Lycoming operator's manual, third edition, under "Operating Instructions," stated:

"4. COLD WEATHER STARTING. During extreme cold weather, it may be necessary to preheat the engine and oil before starting."

It was undetermined if, or how many times, the engine might have been started under extreme cold weather conditions. Temperature, recorded at Laconia Airport at the time of the accident, was 23 degrees Fahrenheit.

Under "Oil Requirements," the operator's manual stated that when using ashless dispersant grade oil, from 0-70 degrees Fahrenheit, the recommended grade oil was SAE 30, 40, or 20W40. Below 10 degrees Fahrenheit, the recommended grade was SAE 30 or 20W30. Service Instruction 1014M recommended the same weights.

According to a maintenance receipt, the airplane's last annual inspection was completed on June 29, 1998. At that time, the oil was changed, and 12 quarts of 15W50 oil were added.

According to Textron Lycoming Service Instruction 1009AM, dated November 4, 1998:

"Engine deterioration in the form of corrosion (rust) and the drying out and hardening of composition materials such as gaskets, seals, flexible hoses and fuel pump diaphragms can occur if an engine is out of service for an extended period of time. Due to the loss of a protective oil film after an extended period of inactivity, abnormal wear on soft metal bearing surfaces can occur during engine start. Therefore, all engines that do not accumulate the hourly period of time between overhauls specified in this publication are recommended to be

overhauled in the twelfth year."

The engine had been installed in the airplane in 1984, when it was new, and there was no record of overhaul. Recommended time between overhaul was 2,000 hours. Tachometer time, as noted in the last known maintenance receipt, was 919.1 hours as of October 23, 1998.

On January 6, 1999, the wreckage was released to a representative from Ryan Aircraft Services, Inc., Biddeford, Maine.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	65, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Multi-engine Sea; Single-engine Land; Single-engine Sea	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 Valid Medical--w/ waivers/lim.	<b>Last FAA Medical Exam:</b>	10/02/1998
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	700 hours (Total, all aircraft)		

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Lake	<b>Registration:</b>	N14001
<b>Model/Series:</b>	LA-4-250 LA-4-250	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	6
<b>Landing Gear Type:</b>	Retractable - Hull; Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	07/03/1998, Annual	<b>Certified Max Gross Wt.:</b>	3140 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>		<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed	<b>Engine Model/Series:</b>	IO-540
<b>Registered Owner:</b>	DAVID L. PENNEY	<b>Rated Power:</b>	250 hp
<b>Operator:</b>	DAVID L. PENNEY	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	LCI, 545 ft msl	Distance from Accident Site:	3 Nautical Miles
Observation Time:	1215 EST	Direction from Accident Site:	60°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	10 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:	Variable	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	-5° C / -11° C
Precipitation and Obscuration:			
Departure Point:	LACONIA, NH (LCI)	Type of Flight Plan Filed:	IFR
Destination:	MANCHESTER, NH (MHT)	Type of Clearance:	IFR
Departure Time:	1215 EST	Type of Airspace:	Class G

## Airport Information

Airport:	LACONIA MUNICIPAL (LCI)	Runway Surface Type:	Asphalt
Airport Elevation:	545 ft	Runway Surface Condition:	Dry
Runway Used:	26	IFR Approach:	None
Runway Length/Width:	5286 ft / 100 ft	VFR Approach/Landing:	Forced Landing

## Wreckage and Impact Information

Crew Injuries:	1 Fatal, 1 Serious	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	Unknown
Total Injuries:	1 Fatal, 1 Serious	Latitude, Longitude:	

## Administrative Information

Investigator In Charge (IIC):	JIM CAIN	Report Date:	12/05/2000
Additional Participating Persons:	TED DOMIN; PORTLAND, ME EDWARD ROGALSKI; WILLIAMSPORT, PA PHILIP BAKER; LACONIA, NH		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).